What is claimed is:

1. A method for hot-dip galvanizing, comprising the steps of:

dividing a plating vessel which holds a molten metal into a plating tank located at upper portion thereof and a dross removing tank located beneath the plating tank;

conducting hot-dip galvanizing by immersing a steel strip in a molten metal bath in the plating tank;

transferring the molten metal bath from the plating tank to the dross removing tank;

removing dross from the molten metal bath in the dross removing tank; and

recycling the molten metal bath from the dross removing tank to the plating tank through an opening on the plating tank.

2. The method of claim 1, wherein the step of transferring the molten metal bath to the dross removing tank comprises the transferring the molten metal bath from the plating tank to the dross removing tank using a mechanical pump.

3. The method of claim 1, further comprising the step of dissolving a solid phase metal, which is used for plating, in the dross removing tank.

4. The method of claim 1, wherein the step of transferring the molten metal bath to the dross removing tank comprises transferring the molten metal bath from the plating tank to the dross removing tank by sucking up the molten metal bath at bottom center portion of the plating tank.

5. The method of claim 1, wherein the step of recycling the molten metal bath to the plating tank comprises recycling the molten metal bath containing a supernatant after removed the dross to the plating tank through an opening of the plating tank.

6. The method of claim 1, wherein the step of recycling the molten metal bath to the plating tank comprises recycling the molten metal bath from the dross removing tank to the plating tank through a side wall of the plating tank, which side wall is located at exit side of the steel strip and has a height lower than the surface level of the molten metal bath.

7. The method of claim 1, wherein

the plating tank and the dross removing tank satisfy the relation of $W1 \leqq 10\ m^3$ and $W1 \leqq W2$, wherein W1 is the capacity of the plating tank and W2 is the capacity of the dross removing tank; and

the flow rate of molten metal bath being transferred from the plating tank to the dross removing tank is in a range of from 1 to 10 m^3/hour.

8. The method of claim 1, wherein the step of conducting the hot-dip galvanizing is performed in an arrangement that side walls and a bottom wall are arranged so as the distances between the steel strip and the side wall of the plating tank and between the steel strip and the bottom wall of the plating tank are in a range of from 200 to 500 mm.

9. An apparatus for hot-dip galvanizing comprising:

a plating vessel which holds a molten metal;

a plating tank which is located at upper portion of the plating vessel and which conducts the hot-dip galvanizing by immersing a steel strip thereinto;

a dross removing tank which is located at lower portion of the plating vessel and which removes dross from the molten metal;

a transfer means which transfers a molten metal bath in the plating tank to the dross removing tank; and

an opening positioned on the plating tank to recycle the molten metal bath from the dross removing tank to the plating tank.

10. The apparatus of claim 9, wherein the transfer means is a mechanical pump.

11. The apparatus of claim 9, wherein the transfer means is a mechanical pump, and a suction opening of the mechanical pump to suck the molten metal is positioned at bottom center portion of the plating tank.

12. The apparatus of claim 9, further comprising a dissolving means to dissolve a solid phase metal, which is used for plating, in the dross removing tank.

13. The apparatus of claim 9, wherein the opening is positioned so as a supernatant bath after removed the dross in the dross removing tank to recycle to the plating tank.

14. The apparatus of claim 9, wherein the plating tank has a side wall which is located at exit side of the steel strip and

which has a height lower than the surface level of the molten metal bath, and the molten metal bath is recycled from the dross removing tank to the plating tank through the side wall.

15. The apparatus of claim 9, wherein

the plating tank and the dross removing tank satisfy the relation of $W1 \leqq 10\ m^3$ and $W1 \leqq W2$, wherein W1 is the capacity of the plating tank, and W2 is the capacity of the dross removing tank; and

the mechanical pump is able to transfer the molten metal bath at a flow rate in a range of from 1 to 10 m^3/hour.

16. The apparatus of claim 9, wherein the plating tank has side walls and a bottom wall, and these walls are allotted so as the distances between the steel strip and the side walls of the plating tank and between the steel strip and the bottom wall of the plating tank are in a range of from 200 to 500 mm.

17. The apparatus of claim 9, wherein the plating tank has a pipe to fix the bottom portion, through which pipe the draining is conducted.

18. A method for hot-dip galvanizing, comprising the steps of:

locating a separation wall inside of a plating tank which holds a molten metal to divide the plating tank into a plating zone where a steel strip is subjected to hot-dip plating, and a dross removing zone where dross in a molten metal bath is removed;

plating the steel strip in the plating zone;

transferring the molten metal bath in the plating zone to

the dross removing zone;

removing the dross from the molten metal bath in the dross removing zone; and

recycling a supernatant bath after removed the dross in the dross removing zone by locating a weir on the separation wall.

19. The method of claim 18, wherein the step of transferring the molten metal bath to the dross removing zone comprises the transferring the molten metal bath from the plating zone to the dross removing zone using a mechanical pump.

20. The method of claim 18, further comprising a heating device in the dross removing zone to conduct heating control so that the temperature of the molten metal bath in the plating zone becomes a predetermined level.

21. The method of claim 18, wherein the plating zone has a molten metal bath capacity of W1, and the dross removing zone has a molten metal bath capacity of W2, and W1/W2 is in a range of from 0.2 to 5.

22. A method for hot-dip galvanizing, comprising the steps of:

arranging a separation wall inside of a plating tank which holds a molten metal to divide the plating tank into a plating zone where a steel strip is subjected to hot-dip plating, a first dross removing zone and a second dross removing zone, where a dross in a molten metal bath is removed in the first dross removing zone and the second dross removing zone;

mounting a first mechanical pump to transfer the molten metal bath from the plating zone to the first dross removing zone and

locating a weir to recycle the molten metal bath to the plating zone;

mounting a second mechanical pump to transfer the molten metal bath from the plating zone to the second dross removing zone and locating a weir to recycle the molten metal bath to the plating zone;

plating the steel strip in the plating zone;

removing the dross by transferring the molten metal bath from the plating zone to the first dross removing zone using the first mechanical pump; and

discharging the dross deposited in the second dross removing zone to outside the plating tank by stopping the mechanical pump in the second dross removing zone.

23. An apparatus for hot-dip galvanizing, comprising:

a plating tank which holds a molten metal;

a separation wall located in the plating tank to divide the plating tank into a plating zone where a steel strip is subjected to hot-dip plating, and a dross removing zone where dross from a molten metal bath is removed;

a mechanical pump which transfers the molten metal bath from the plating zone to the dross removing zone; and

a weir located to the separation wall to transfer a supernatant bath of the molten metal bath after removed the dross in the dross removing zone to the plating zone.

24. The apparatus of claim 23, further comprising a heating device which is located in the dross removing zone and controls the temperature of molten metal bath by heating thereof.

25. The apparatus of claim 23, wherein the plating zone has a molten metal bath capacity of W1, and the dross removing zone has a molten metal bath capacity of W2, and W1/W2 is in a range of from 0.2 to 5.

26. An apparatus for hot-dip galvanizing, comprising:

a plating tank which holds a molten metal;

a separation wall located in the plating tank to divide the plating tank into a plating zone where a steel strip is subjected to hot-dip plating, and a dross removing zone where dross in the molten metal bath is removed;

the dross removing zone comprising a first dross removing zone and a second dross removing zone;

a first mechanical pump which transfers the molten metal bath from the plating zone to the first dross removing zone;

a second mechanical pump which transfers the molten metal bath from the plating zone to the second dross removing zone;

a first weir located to the separation wall to transfer a supernatant bath of the molten metal bath after removed the dross in the first dross removing zone to the plating zone; and

a second weir located to the separation plate to transfer a supernatant bath of the molten metal bath after removed the dross in the second dross removing zone to the plating zone.

27. A method for hot-dip galvanizing, comprising the steps of:

arranging a separation wall inside of a plating tank which holds a molten metal to divide the plating tank into a plating zone where a steel strip is subjected to hot-dip plating, and a dross removing zone where dross in a molten metal bath is

removed;

continuously plating the steel strip in the plating zone using a sink roll;

transferring the molten metal bath above the sink roll in the plating zone to the dross removing zone using a mechanical pump;

removing the dross from the molten metal bath in the dross removing zone; and

recycling a supernatant bath after removed the dross in the dross removing zone to the plating zone via a weir located on the separation wall.

28. The method of claim 27, further comprising the step of arranging a heating device in the dross removing zone to conduct heating control so that the temperature of the molten metal bath in the plating zone becomes a predetermined level.

29. The method of claim 27, wherein the plating zone has a molten metal bath capacity of W1, and the dross removing zone has a molten metal bath capacity of W2, and W1/W2 is in a range of from 0.2 to 5.

30. An apparatus for hot-dip galvanizing comprising:

a plating tank which holds a molten metal;

a sink roll which makes a steel strip immerse in and travel through the molten metal;

a separation wall located in the plating tank to divide the plating tank into a plating zone where the steel strip is subjected to hot-dip plating, and a dross removing zone where dross in the molten metal bath is removed;

a mechanical pump which transfers the molten metal bath above

a sink roll in the plating zone to the dross removing zone; and

a weir located on the separation wall to transfer a supernatant bath of the molten metal bath after removed the dross in the dross removing zone to the plating zone.

31. The apparatus of claim 30, further comprising a heating device which is located in the dross removing zone to control the temperature of the molten metal bath by heating thereof.

32. The apparatus of claim 30, wherein the plating zone has a molten metal bath capacity of W1, and the dross removing zone has a molten metal bath capacity of W2, and W1/W2 is in a range of from 0.2 to 5.

33. A method for hot-dip galvanizing comprising the steps of:

locating a sink roll which guides a steel strip traveled through a snout into a plating vessel which holds a molten metal;

separating the plating vessel into a plating zone and a dross removing zone by locating a plating tank so as to cover the sink roll, and by locating a shielding member to shield a gap formed between a lower portion of the snout beneath the steel strip and an upper portion of the plating tank;

conducting hot-dip galvanizing by immersing the steel strip in the plating zone;

removing dross from a molten metal bath in the plating zone by discharging the molten metal bath from the plating zone to the dross removing zone using a mechanical pump; and

recycling the molten metal bath from the dross removing zone to the plating zone.

34. The method of claim 33, wherein the plating tank is located so that the upper end of the plating tank becomes higher than the level of a rotary shaft of the sink roll.

35. An apparatus for hot-dip galvanizing, comprising:

a snout through which a steel strip travels;

a plating vessel which holds a molten metal, which plating vessel has a sink roll to guide the steel strip traveled through the snout;

a plating zone to conduct hot-dip galvanizing by immersing the steel strip thereinto and a dross removing zone to remove dross from a molten metal bath, which zones are formed by locating a shielding member to shield a gap formed between a lower portion of the snout beneath the steel strip and an upper portion of a side wall of the plating tank; and

a mechanical pump to discharge the molten metal bath from the plating zone to the dross removing zone and also to recycle the molten metal bath from the dross removing zone to the plating zone.

36. The apparatus of claim 35, wherein the plating tank is located so as the upper end of the plating tank to become higher than the level of a rotary shaft of the sink roll.

37. An apparatus for hot-dip galvanizing, comprising:

a plating bath tank which holds a hot-dip galvanizing bath containing aluminum at contents of 0.05 wt.% or more;

a snout through which a steel strip immersed in the plating bath tank travels;

a plating tank which conducts plating and a dross removing

tank which separates dross by sedimenting the dross, both of which tanks are formed by locating a separation wall in the plating bath tank;

a snout cleaning device to connect the plating tank and the dross removing tank at directly below the snout and at a part of exit of the steel strip so as a connecting passage to have 0.1 meter or more hydraulic diameter defined by a formula given below and so as the bath levels of both tanks to become equal to each other, to suck the plating bath in the snout by a pump from both longitudinal edges of the snout to discharge the sucked bath to a portion where no steel strip travels, thus cleaning the plating bath surface in the snout, and to circulate the plating bath between the plating tank and the dross removing tank; wherein the hydraulic diameter is defined as

Hydraulic diameter = {(Cross sectional area of flow passage)/ (Wet length of flow passage)} x 4

38. The apparatus of claim 37, wherein the capacity of the plating tank is 10 m^3 or less and the capacity of the dross removing tank is 10 m^3 or more.

39. A method for hot-dip galvanizing, comprising the steps of:

locating a separation wall in a plating bath tank which holds a hot-dip galvanizing bath containing aluminum in an amount of 0.05 wt.% or more to divide the plating bath tank into a plating tank which conducts plating and a dross removing tank which dissolves an ingot and which separates dross by sedimenting thereof;

connecting the plating tank and the dross removing tank at directly below the snout and at a part of exit of the steel strip

so as a connecting passage to have 0.1 meter or more hydraulic diameter defined by a formula given below and so as the bath levels of both tanks to become equal to each other, and sucking the plating bath in the snout by a pump from both longitudinal edges of the snout to discharge the sucked bath to a portion where no steel strip travels, thus cleaning the plating bath surface in the snout and circulating the plating bath between the plating tank and the dross removing tank, wherein the hydraulic diameter is defined as

Hydraulic diameter = {(Cross sectional area of flow passage)/ (Wet length of flow passage)} x 4

40. The method of claim 39, wherein the capacity of the plating tank is 10 m^3 or less, the capacity of the dross removing tank is 10 m^3 or more, and the circulation flow rate of the plating bath between the plating tank and the dross removing tank is from 0.5 to 5 m^3/hour.

41. An apparatus for hot-dip galvanizing comprising:

a molten zinc tank which holds a molten zinc and has a heating means for heating the molten zinc;

a sink roll which is immersed in the molten zinc in the molten zinc tank and around which a steel strip is wound;

a vessel which holds the sink roll therein and comprises side panels and a bottom panel, while opening the upper end thereof;

whereby hot-dip galvanizing is performed to a continuously fed steel plate in the molten zinc tank.

42. The apparatus of claim 41, wherein the heating means of the molten zinc tank conducts coreless induction heating.

43. The apparatus of claim 41, wherein the vessel keeps gaps of from 200 to 500 mm between the vessel wall and the steel strip traveling through the vessel, the sink roll, and jigs to fix the sink roll.

44. The apparatus of claim 41, further comprising a cover which substantially covers the lower surface of the steel strip being immersed in the molten zinc in the molten zinc tank until the steel strip reaches the vessel.

45. The apparatus of claim 41, wherein the vessel has a curved face at joints of the side plates and the bottom plate.

46. The apparatus of claim 41, wherein the vessel has a discharge opening at the bottom thereof to discharge the molten zinc, through which discharge opening the molten zinc is forcefully discharged into the molten zinc tank.

47. A method for hot-dip galvanizing, comprising the steps of:

dividing a plating vessel which holds a molten metal into a dross removing tank and a plating tank which is located in the dross removing tank;

conducting hot-dip galvanizing by immersing a steel strip in a molten metal bath in the plating tank;

transferring the molten metal bath from the plating tank to the dross removing tank using a mechanical pump and using a flow accompanied with the traveling steel strip appeared at a first

opening;

removing a dross from the molten metal bath in the dross removing tank; and

recycling the molten metal bath from the dross removing tank to the plating tank via a second opening located on the plating tank.

48. The method of claim 47, wherein the plating tank keeps gaps of from 200 to 500 mm between the walls of plating tank and the steel strip, and between the walls of plating tank and the sink roll in the bath, and the plating tank and the dross removing tank satisfy the relation of $W1 \leqq 10\ m^3$ and $W1 \leqq W2$, wherein W1 is the capacity of the plating tank, and W2 is the capacity of the dross removing tank, and the flow rate of molten metal bath being transferred from the plating tank to the dross removing tank is in a range of from 1 to 10 m^3/hour.

49. An apparatus for hot-dip galvanizing comprising:

a plating vessel which holds a molten metal, wherein the plating vessel comprises a dross removing tank which removes dross from the molten metal, and a plating tank which is located in the dross removing tank and which conducts hot-dip galvanizing to a steel strip;

a transfer means which transfers a molten metal bath from the plating tank to the dross removing tank;

a first opening which is located at the plating tank and functions to transfer the molten metal bath from the plating tank to the dross removing tank using a flow accompanied with the traveling steel strip; and

a second opening which is located at the plating tank and

which functions to recycle the molten metal bath from the dross removing tank to the plating tank.

50. The apparatus of claim 49, wherein the plating tank keeps gaps of from 200 to 500 mm between the walls of plating tank and the steel strip, and between the walls of plating tank and the sink roll in the bath, and the plating tank and the dross removing tank satisfy the relation of $W1 \leqq 10\ m^3$ and $W1 \leqq W2$, wherein W1 is the capacity of the plating tank, and W2 is the capacity of the dross removing tank.